

## REMARKS

Claims 1-15 are pending in the present application. Claims 1-8 have been withdrawn from further consideration, and claims 9-15 are rejected. Claim 9 is amended hereby.

Responsive to the rejection of claims 9-12 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,670,803 (Beilstein, Jr., et al.) in view U.S. Patent No. 3,633,077 (Tsiji, et al.), Applicants have amended claim 9 and submit that claim 9 is now in condition for allowance.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)(Emphasis Added).

Claim 9, as amended, recites in part "an opening defined by said second and third active layers, said opening extending through the third active layer, said opening contacting and terminating within the second active layer". (*Emphasis Added*). Applicants submit that such a structure is not shown or suggested by the cited references, alone or in combination, and that therefore a *prima facie* case of obviousness has not been established in regard to claim 9.

The SRAM device of Beilstein, Jr., et al., includes an opening (at 83 in Fig. 16A) that extends through silicon-on-insulator (SOI) layer 55 of the device. The opening extends entirely through the first, second and third active layers,

identified by the Examiner as layers 65", 67" and 69", respectively. The opening of Beilstein, Jr. et al., does not terminate within the second active layer. In fact, the opening simply does not terminate in any way within the SOI layer. Thus, Beilstein, Jr., et al., fails to disclose or suggest an opening defined by the second 5 and third active layers, that extends through the third active layer, and which contacts and terminates within the second active layer, as recited in part by amended claim 9.

The Examiner relies upon the Tsuji, et al., reference for the single purpose of teaching the use of compound semiconductor materials instead of non-10 compound semiconductor materials. The Examiner does not assert that Tsuji, et al., discloses or suggest the above-quoted subject matter recited in part by amended claim 9. Applicant submits that Tsuji, et al., in fact fails to disclose or suggest the above-quoted subject matter recited in part by amended claim 9.

Further, claim 9 recites in part "a fourth compound semiconductor material" 15 [is] at least partially within the [trench] opening, . . . and is electrically connected to the second active layer". (*Emphasis Added*). Applicants submit that such a limitation is not shown or suggested by the cited references, alone or in combination, and that therefore a *prima facie* case of obviousness has not been established in regard to claim 9.

20 It is well established that a patent applicant is entitled to be his own lexicographer. *In re Hill*, 161 F.2d 367, 73 USPQ 482 (CCPA 1947). The

present Specification defines a compound semiconductor material as including “at least two dissimilar elements that form a semiconductor material.” (page 5, lines 17-18, of the present Specification). As an example, the present Specification provides that “at least two dissimilar Group IVA elements such as 5 carbon, silicon, or germanium can be part of the [compound] semiconductor material.” (page 5, lines 18-20, of the present Specification).

The Examiner interprets the device of Beilstein, Jr. et al., as having a fourth semiconductor material (83) within the opening. However, Beilstein, Jr. et al., itself identifies this material as polysilicon fill. Polysilicon fill 85 within active 10 trench 39 and polysilicon fill 83 within N+ rail trench 39 are doped with an N dopant to produce N+ doped regions therein for increasing conductivity. (column 7, lines 44-47). Polysilicon fill is not considered by one of ordinary skill in the art to be a compound semiconductor material. Further, polysilicon fill does not fit within the definition of a compound semiconductor material as provided within the 15 present Specification. Thus, Beilstein, Jr., et al., fails to disclose or suggest a fourth compound semiconductor material is at least partially within the [trench] opening and is electrically connected to the second active layer, as recited in part by amended claim 9.

As discussed above, the Examiner relies upon the Tsuji, et al., reference 20 for the single purpose of suggesting the use of compound semiconductor materials instead of non-compound semiconductor materials. However,

Applicants submit that what Tsuji, et al., actually discloses is that the semiconductor substrate may be made of other semiconductor materials. "The semiconductor substrate may be made of other semiconductor materials, for example, germanium, silicon carbide, gallium phosphide, gallium arsenide and 5 others in addition to silicon." (*column 3, lines 13-16*). The Examiner does not assert that Tsuji, et al., discloses or suggest that such other semiconductor materials can be substituted for polysilicon fill. Applicants submit that Tsuji, et al., fails to disclose or suggest that such other semiconductor materials can be substituted for polysilicon fill. Thus, Tsuji, et al., fails to disclose or suggest a 10 fourth compound semiconductor material at least partially within the [trench] opening and electrically connected to the second active layer, as recited in part by amended claim 9.

Since the cited references fail to teach or suggest, alone or in combination, all the limitations of claim 9, Applicants submit that a *prima facie* 15 case of obviousness has not been established in regard thereto. Accordingly, Applicants request withdrawal of the rejection and submit that claim 9 and claims 10-15 depending therefrom are now in condition for allowance, which is hereby respectfully requested.

Moreover, obviousness can only be established by combining or modifying 20 the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references

themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). However, if a proposed modification renders the prior art invention being modified unsatisfactory for its intended purpose there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Therefore, if a proposed modification renders the prior art invention being modified unsatisfactory for its intended purpose a *prima facie* case of obviousness has not been established.

The Examiner states that it would have been obvious to modify the device of Beilstein, Jr., et al., by substituting the compound semiconductor materials taught by Tsuji, et al., for the semiconductor materials used in the Beilstein, Jr., et al., device. Applicants submit that such a modification renders the composite device unsatisfactory for its intended purpose, and that therefore a *prima facie* case of obviousness has not been established.

The Examiner, as discussed above, has identified material 83 within the trench opening of Beilstein, Jr., et al., as being a fourth semiconductor material. Assuming *arguendo* that polysilicon fill material 83 is a fourth semiconductor material, substituting a compound semiconductor material for polysilicon fill 83 renders the composite device unsatisfactory for its intended purpose. More particularly, the N+ rail formed by the highly-doped polysilicon fill 83 within trench

37 (Fig. 16A) electrically connects to the source and body regions of transistors 209 and 211 (Fig. 23). (*column 9, lines 35-37*). Replacing the conductive polysilicon fill with a compound semiconductor renders the trench only semi-conductive at best, thereby rendering the trench and the device as a whole 5 unsatisfactory for its intended purpose.

Since the proposed modification renders the resulting composite device unsatisfactory for its intended purpose, a *prima facie* case of obviousness has not been established. Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of claim 9 and claims 10-15 depending therefrom.

10       Claims 13 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,670,803 (Beilstein, Jr., et al.) in view U.S. Patent No. 3,633,077 (Tsuiji, et al.) and further in view of U.S. Patent No. 5,736,863 (Liu). Responsive thereto, Applicants respectfully point out that claims 13 and 14 depend from claim 9 which is in condition for allowance for the 15 reasons given hereinabove. Accordingly, Applicants submit that claims 13 and 14 are also in condition for allowance and respectfully request same.

Claim 15 was rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,670,803 (Beilstein, Jr., et al.) in view U.S. Patent No. 3,633,077 (Tsuiji, et al.) and further in view of U.S. Patent No. 3,866,310 (Driver).

20       Responsive thereto, Applicants respectfully point out that claim 15 depends from claim 9 which is in condition for allowance for the reasons given hereinabove.

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Accordingly, Applicants submit that claim 15 is also in condition for allowance and respectfully request same.

For all the foregoing reasons, Applicants submit that no combination of the  
5 cited references teaches, discloses or suggests the subject matter of the pending  
claims. The pending claims are therefore in condition for allowance.

Accordingly, Applicants respectfully request withdrawal of all rejections and  
allowance of the claims.

In the event Applicants have overlooked the need for an extension of time,  
10 an additional extension of time, payment of fee or additional payment of fee,  
Applicants hereby conditionally petitions therefor.

The Examiner is invited to telephone the undersigned in regard to this  
Amendment and the above identified application.

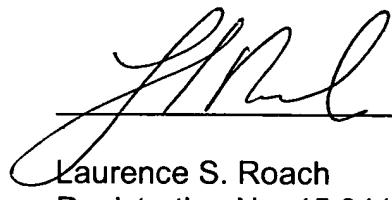
Respectfully submitted,

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